

What is Claimed Is:

1. A fuel cell comprising:  
a polymer electrolyte membrane,  
a pair of electrodes sandwiching the polymer electrolyte membrane,  
an anode side separator with gas channels to supply fuel to at least one of the electrodes, and  
a cathode side separator with gas channels to supply oxidant to the other electrode,  
wherein at least one of the separators has a groove over an edge of at least one of the pair of electrodes.
2. The fuel cell according to claim 1, wherein the at least one of the pair of electrodes comprises a catalyst layer contacting the polymer electrolyte membrane and a gas diffusion layer over the catalyst layer.
3. The fuel cell according to claim 1, wherein the depth of the groove is about 80% to about 120% of the compressed thickness difference of the electrode or a layer thereof or a layer thereon in contact with the separator.
4. The fuel cell according to claim 1, wherein a gasket is arranged outside the groove of the separator.
5. The fuel cell according to claim 2, wherein the groove of the separator is at a position where the gas channel intersects with the gas diffusion layer so that the groove is not connected to the gas channels.
6. The fuel cell according to claim 1, wherein a gasket is arranged inside the groove of the separator.

7. The fuel cell according to claim 6, wherein the gasket contacts the gas diffusion layer where the gas diffusion layer has a substituted gas sealing material.

8. A separator for contacting an electrode of a fuel cell having a groove therein that is substantially isolated from any gas channel and approximately positioned over an outer edge of an electrode of a fuel cell.

9. A method of manufacturing a fuel cell, the method comprising:  
sandwiching a pair of electrodes, each composed of a catalyst layer and gas diffusion layer, with a polymer electrolyte membrane, and  
sandwiching a pair of separators on either electrode by applying lower pressure at the edges of the gas diffusion layer and higher pressure at the center of the gas diffusion layer.

10. The method of claim 9, wherein at least one of the pair of separators has a groove therein approximately positioned over an outer edge of the pair of electrodes.